

# PRV

PATENT- OCH REGISTRERINGSVERKET  
Patentavdelningen

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Rec'd PCT/PTO 16 JUN 2005

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## Intyg Certificate

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This is to certify that the annexed is a true copy of the documents as originally filed with the Patent- and Registration Office in connection with the following patent application.

- (71) Sökande                      ABB AB, Västerås SE  
Applicant (s)
- (21) Patentansökningsnummer    0203779-4  
Patent application number
- (86) Ingivningsdatum                      2002-12-19  
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Stockholm, 2004-01-09

För Patent- och registreringsverket  
For the Patent- and Registration Office

*[Handwritten signature]*

Lisa Junegren

Avgift  
Fee

## PRIORITY DOCUMENT

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2002-10-08  
4-9478SE/LG

URL-based access to Aspect Objects

5 TECHNICAL FIELD

The present invention is concerned with control systems where real world objects are represented as Aspect Objects. The method and the system according to the invention are particularly suitable for use at industrial  
10 plants in industries such as a chemical, pharmaceutical, food, metal, mines, building material, pulp and paper. Other industries and utilities where the invention is particular useful are automotive, consumer products, power generation, power distribution, waste water  
15 handling, oil refineries, pipe-lines and off-shore platforms.

BACKGROUND ART

WO00102953 entitled "Method of integrating an application  
20 in a computerized system" describes a method to represent real world objects in a computerized system in a systematic way, in which different types of information about the real world object may be obtained, linked to the real world entity, processed, displayed and acted on.  
25 In WO 00102953 a real world object is represented of a certain kind of software object called a composite object. Each application integrated in the computerized system defines interfaces that are independent of the implementation of the application itself. These  
30 interfaces may be used by other applications, implementing other aspects or groups of aspects of a composite object (in this description a composite object is referred to as an Aspect Object), such that the applications can co-operate to provide functionality for

- the representation of a real world entity that is the sum of all aspects. A problem with the disclosed method is that it requires that certain software modules are installed on a client device in order to access the application integrated in the system. Another problem with the method disclosed in WO00102953 is that it does not disclose how to resolve access to an aspect of Aspect Object by internet or by an intranet based on internet technology.
- 10 US 6,170,007 describes how a web server in a device provides access to the user interface functions for the device through a device web page. A network interface in the device enables access to the web page by a web browser such that a user of the web browser accesses the user interface functions for the device through the web page.
- 15 US 6,400,997 describes an apparatus and a method for factory automation and tracking with focus on a factory automation apparatus which includes a plurality of portable tablets and an automation server in a wireless communication.
- 20 There are a number of enabling technologies that enable remote access across a network. Examples of such technologies are RPC (Remote Procedure Calls), DCOM (Distributed COM) and CORBA (Common Object Request Broker Architecture). Another example of a technology enabling remote access to objects by use of Internet technologies is called Web Services.
- 25  
30

WO 0077653A1 describes a method and apparatus for providing network services for businesses. The description relates how HTTP (Hypertext Transfer Protocol) may be used, including the HTTP methods GET and POST to provide input data for a web service. The description also includes such functions as one called a Web Service Provider and one called a Web Services Directory. The latter function provides information about which web services are available and where they may be found. A remaining problem is how to get access from a web browser to different functions of a real world object represented as an Aspect Object, such as a CAD-drawing or maintenance record of the device, where the functionality resides in a number of un-related applications.

15

#### SUMMARY OF THE INVENTION

An object of the invention is to provide access from a web presentation means to an Aspect of an Aspect Object representing a function of a real world object and to adapt a response message, not only to the performed function, but also to a contextual information about the web presentation means. A web presentation means is any type of presentation means used to access and present information available via Internet or an Intranet. In a preferred embodiment the web presentation means is a web browser. The contextual information describes characteristics of the web presentation means.

The above object is achieved by a method comprising the step of receiving a web request in a web server, which web request is sent by a web presentation means and said web request comprises a Uniform Resource Locator (URL), which URL comprise means to identify the Aspect Object

and the Aspect of the Aspect Object. The method comprises the additional step of identifying in a software application the Aspect Object and the Aspect by use of information in the URL. Further the method comprises the

5 step of querying the identified Aspect Object from the software application for an interface to an Aspect System Object associated with the Aspect. The method also comprises the step of querying the identified Aspect Object from the software application for an interface to

10 an Aspect System Object associated with the Aspect. A further step is receiving from the Aspect System Object to the software application a reference to an interface of the Aspect System Object, which implements the function of the identified Aspect, and invoking

15 functionality of the Aspect by means of the reference. The further step of sending a response message to the world wide web presentation means, which response message is adapted to a contextual information which describes characteristics of the world wide web presentation means,

20 wherein the world wide web presentation means is updated with the result of the performed function of the real world object.

According to a preferred embodiment the contextual

25 information is comprised in the web request sent from the world wide web presentation means.

According to another preferred embodiment the response message is adapted according to the contextual

30 information by an Aspect System Object.

In one embodiment the response message is adapted as a HTTP response. In another embodiment the response message is adapted according to extensible markup language (XML).

- 5 An advantage with the invention is that it enables access from a web presentation means to an Aspect of an Aspect Object without having to pre-install other software than standard software on the client device.
- 10 Another advantage with the invention is that it enables access to an Aspect of an Aspect Object from any type of a device which hosts a web presentation means.

It should be appreciated that the Aspect associated with capabilities of the above described method may be inherited to an Aspect Object other than the Aspect Object previously referred to. Such inheritance is made in run-time between Aspect Objects through a hierarchical structure, while the operation of the real-world objects are maintained.

A further object of the invention is to provide a control system comprising a web server, an Aspect Object, an Aspect System Object and a software application characterized in that the system executes the steps of the above described method.

Yet another object of the invention is to provide a computer program product which when run on a computer or a processor causes said computer or processor to carry out one or more steps of the above described method.

An Aspect Object is a certain type of software object. Different functions or facets of a real world object, such as its physical location, the current stage in a process, a control function, an operator interaction, a simulation model, some documentation about the real world object is described as different Aspects of the Aspect Object. Each Aspect Object is a container for one or more Aspects. An Aspect Object is not an object in the traditional meaning of object-oriented systems, but rather a container of references to such traditional objects, which implement the different Aspects.

#### BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be described in more detail in connection with the enclosed schematic drawings.

Figure 1 shows an overview of a method according to prior art for a client application to access a software application available for access via an Aspect System Object.

Figure 2 shows a schematic overview of a method based on the invention.

Figure 3 shows a schematic overview of a system based on the invention where user of a web presentation means such as a thin client gets access to a function of a real world object accessible via an Aspect System Object via a web server.

# DETAILED DESCRIPTION OF THE INVENTION

In order to appreciate the invention it is beneficial to study some specific prior art. WO00102953, hereby  
 5 incorporated by reference, describes a method for integration of many and various types of applications in a computerized system, based on a concept where real world objects are represented as Aspect Objects. Figure 1 shows a schematic overview of how according to prior art  
 10 a client application 1 queries an Aspect Object 3 for a function associated with an Aspect, the system finds a reference to an interface of an Aspect System Object 8 by means of a Table look-up 4, the reference is returned to the client 9. The Aspect System Object 12 may contain  
 15 several references to traditional objects and software applications.

Figure 2 shows an overview of a method according to the invention. The invention enables access to at least one  
 20 aspect of an Aspect Object 3 from a world wide web (www) presentation means 26. A world wide web presentation means 26 is any type of presentation means used to access and present information available via Internet or an Intranet. An example of a world wide web presentation  
 25 means is a web browser. Examples of devices capable of executing such world wide web presentation means 26 are a personal computer, a cell phone, a Personal Digital Assistant (PDA) or a hand held computing device. In a preferred embodiment no additional software is necessary  
 30 to be pre-installed in such a device hosting the world wide web presentation means 26. It should be appreciated that by using an embodiment of the invention a user 31 (shown in figure 3), such as a process operator, may



select and access an Aspect of an Aspect Object 3 from a standard world wide web presentation means 26. This in contrast to what was previous known in prior art.

- 5 Further figure 2 shows that a web server 21 and a software application 27 provides access to an Aspect of an Aspect Object 3 relating to a real world object 13, such as the real world object shown in figure 3. The presentation of the Aspect Object 3 in figure 2 can be  
10 made in multiple ways. As an example the world wide web presentation means 26 may present the Aspect Object 3 in structures or in process graphics. The world wide web presentation means 26 may also present the Aspect Object 3 in text fields, which is a particular advantage if the  
15 world wide web presentation means 26 executes on a device with a small display such as a cell phone. A method according to the invention provides a response to a request for a function of a real world object 13 connected to a control system 30, which function is  
20 represented as an Aspect of an Aspect Object. In a method according to the invention the world wide web presentation means 26 may choose to invoke a certain Aspect of an Aspect Object 3. Figure 3 shows that the request for a function to a system based on the invention  
25 may be initiated by a user 32, such as a process operator or engineer. As an example initiating a request for a function is performed by a point and click action by the user on a PDA or a personal computer.
- 30 Figure 2 shows that in a method according the invention the world wide web presentation means 26 sends a web request 25 comprising a Uniform Resource Locator (URL)

address with the purpose of getting access to such an Aspect. An example of such a URL is

`http://xyz.com/production?object=pump&aspect=faceplate`

5

In the example above the Aspect Object 3 is a pump and the Aspect of the pump is a faceplate. The URL comprises means to identify an Aspect Object 3 and also means to identify an Aspect of that Aspect Object 3. The means to  
10 identify an Aspect Object 3 may be a name, a path, an object id or other identification used in the URL in order to identify the Aspect Object 3. The URL also comprises a name, id or other identification of the Aspect which in the example is the faceplate. The URL  
15 above is an example and in an embodiment of the invention alternative syntax may be used. For instance, the URL string may be comprised in a message defined according to extensible markup language (XML). Further figure 2 shows that, according to the method the web server 21 passes  
20 the contents of the web request 25 to at least one software application 27. The software application 21 has also received contextual information about the accessing world wide web presentation means 26. The contextual information may comprise information on type of browser,  
25 available plug-ins, type of cell phone, screen resolution and/or national language. In a preferred embodiment of the invention the contextual information of the world wide web presentation means 26 is included in the web request 25. The purpose of using the contextual  
30 information is to adapt the response message 20 to the web request 25 according to the information about the world wide web presentation means 26. As an example a response message, which comprises a text string, may be

adapted to the size of the screen of a cell phone.

Another example of how to utilize the contextual information is that depending on the national language of the web presentation means the response message may be adapted to the national language.

The software application 27 identifies the Aspect Object 3 and the Aspect from information specified in the URL. Further figure 2 shows that the software application 27 queries the identified Aspect Object 3 through a known interface 2 for a reference to an interface of the Aspect System Object 12 associated with the Aspect 5. The reference to the Aspect System Object 12 is found by means of a table look-up 4 where the table comprises a set of Aspects 6. Figure 2 also shows that the reference 22a to an interface of the Aspect System Object 12, which implements the identified Aspect, is received 22b by the software application 27.

In a preferred embodiment the contextual information is passed to the Aspect System Object 12. In the preferred embodiment it is the Aspect System Object 12 that determines which algorithm to use to prepare a response message depending on the contextual information about the world wide web presentation means 26.

Figure 2 shows in a schematic way that the reference 22a is received by the software application 27. The reference 22a to the interface of the Aspect System Object 12 is preferably received by the software application 27 through the Aspect Object 3, and that as a result of the previous mentioned query sent through the known interface 2. In an alternative embodiment the reference 22a may be

received 22b directly by the software application 27. The software application 27 invokes 23 functionality accessible by the Aspect System Object 12 by means of the reference 22a. As mentioned above, in a preferred embodiment the software application 27 pass the contextual information or a reference to the contextual information about the world wide web presentation means 26 to the Aspect System Object 12. The Aspect System Object 12 performs the requested function defined as an Aspect of a certain Aspect Object 3. Examples of such a function is to close a valve, retrieve maintenance records of a motor or present a list of available suppliers of a spare part. Since the number of Aspect Objects in a control system is typically several thousands the above mentioned functions are merely examples and should not in any way limit the scope of the invention. Further, in the preferred embodiment the Aspect System Object 12 prepares a response message to the web request 25. The Aspect System Object 12 may in order to handle the preparation of a response message, download a COM or .NET component which matches the information about the world wide web presentation means 26. The response message is preferably a HTTP response and is adapted to the world wide web presentation means 26. Figure 2 indicates that the HTTP response may be sent 24 from the Aspect System Object 12 to the software application 27 and further via 28a the web server 21 to the world wide web presentation means 26. One alternative compared to letting the Aspect System Object 12 prepare a HTTP response is to delegate the web request to a second URL and letting the Aspect System Object 12 exclusively perform the requested function defined in the URL as an Aspect of an Aspect Object. Hence, in such an alternative

it is functionality accessed by the second URL that handles the adaptation of the response message according to the contextual information. Yet another alternative, compared to letting the Aspect System Object prepare a  
5 HTTP response, is to let the Aspect System Object 12 prepare a response as extensible markup language(XML) data. In such an alternative embodiment the Aspect System Object 12 may generate a key that describes the class of data. The key is used to select a transform that converts  
10 the data into HyperText Markup Language (HTML), which is passed back to the world wide web presentation means 26 as a response message.

In an alternative embodiment the contextual information  
15 is used by the software application 27 to determine which reference 22a to the Aspect System Object 12 to query for. In the alternative embodiment it is the software application that determines which algorithm to use in order to adapt the response message according to the  
20 contextual information. In the alternative embodiment the software application 27 receives 22b a plurality of references 22a to the Aspect System Object 12 which each implements the Aspect specified in the web request 25.

25 It should be appreciated that the Aspect associated with capabilities of the above described method may be inherited to an Aspect Object other than the Aspect Object previously referred to. The invention is particular useful in that the inheritance of the  
30 capabilities take place during run-time of the Aspect Objects, that is after the Aspect Objects have been created and/or initiated. For instance it may be so that initially at a plant the method is applied to a first

Aspect Object representing a certain type of Direct Current (DC) motor with one type of characteristics. A method according to the invention is easily applied to another type of equipment which is associated at a later time by letting a corresponding second Aspect Object inherit the association of the Aspect System Object capable of preparing a response message. For instance the Aspect System Object may be capable of preparing a response message based on built in vibration analysis capabilities of the Direct Current motor. An example of such an inheritance is that the first Aspect Object associated with the Direct Current motor has been inserted or created in a Functional Structure. And further in the example, at a later time another equipment for vibration measurement, external from the Direct Current motor, is associated with the second Aspect Object. Further, the second Aspect Object is inserted at a lower position in the Functional Structure than the first Aspect Object, which Aspect associated with the Aspect System Object capable of preparing a response message has been enabled for inheritance. In the example the second Aspect Object inherits the Aspect associated with preparing a response message. Such inheritance is made in run-time between Aspect Objects through a hierarchical structure, such as a Functional Structure, while the operation of the real-world objects are maintained.

Figure 3 shows an overview of a control system 30 based on the invention. The control system 30 comprise a web server 21, a software application 27, an Aspect Object 3 and an Aspect System Object 12 and is able to execute the above described method.

## CLAIMS

1. A method to respond to a request for a function of a real world object (13) connected to a control system (30), which function is represented as an Aspect of an Aspect Object (3) characterized in that the method provides the steps of:
- receiving a web request (25) in a web server (21), which web request (25) is sent by a web presentation means (26) and said web request comprises a Uniform Resource Locator (URL), which URL comprise means to identify the Aspect Object (3) and the Aspect (5) of the Aspect Object,
  - identifying in a software application (27) the Aspect Object (3) and the Aspect by use of information in the URL,
  - querying the identified Aspect Object (3) from the software application (27) for an interface (22a) to an Aspect System Object (12) associated with the Aspect,
  - receiving from the Aspect System Object (12) to the software application (27) a reference to an interface (22a) of the Aspect System Object (12), which implements the function of the identified Aspect,
  - invoking functionality of the Aspect by means of the reference (22a),
  - sending a response message to the world wide web presentation means (26), which response message is adapted to a contextual information which describes characteristics of the world wide web presentation means (26), wherein the world wide web presentation means (26) is updated with the result of the performed function of the real world object (13).

2. A method according to claim 1 characterized in that the contextual information is comprised in the web request (25) sent from the world wide web presentation means (26).

5

3. A method according to claim 2 where the step receiving a web request (25) comprises the additional step of:  
- passing the web request (25) from the web server (21) to the software application (27).

10

4. A method according to any previous claim characterized in that the response message is adapted according to the contextual information by an Aspect System Object (12).

15 5. A method according to claim 4 characterized in that the response message is adapted as an HTTP response.

6. A method according to claim 4 characterized in that the response message is adapted according to extensible markup language (XML).

20

7. A method according to any previous claim characterized in that the Aspect Object (3) during run-time inherits the Aspect from another Aspect Object through a hierarchical structure, wherein the Aspect Object during run-time inherits the association of the Aspect System Object (12).

25

8. A method according to any previous claim characterized in that the web presentation means is a standard web browser.

30

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9. A method according to claim 8 characterized in that the web browser is installed on a wireless device such as a cell phone Personal Digital Assistant(PDA), a cell phone or a handheld computing device.
- 5 10. A method according to any previous claim where the contextual information of the world wide web presentation means describes technical characteristics of the world wide web presentation means such as type of web browser, available plug-ins or screen resolution.
- 10 11. A method according to claim 1 characterized in that the identifying step comprises the additional step of:
  - evaluating in the software application which function
  - 15 of the Aspect System Object the software application should query for a reference based on the contextual information in addition to the identified Aspect Object, the Aspect of the Aspect Object.
- 20 12. A control system comprising a web server, an Aspect Object, an Aspect System Object and a software application characterized in that the system executes the steps of the method in claim 1.
- 25 13. A computer program product which when run on a computer or a processor causes said computer or processor to carry out one or more steps of a method according to claim 1.

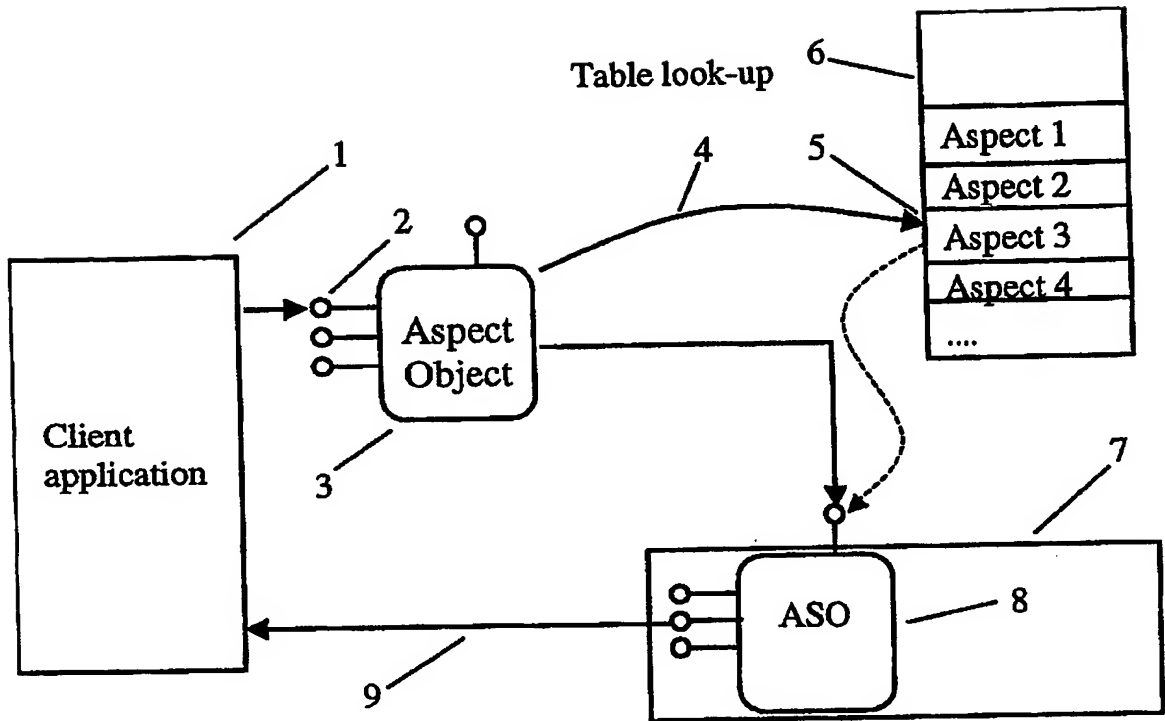
ABSTRACT

A method provides access to Aspects of Aspect Objects from a standard web browser. A web browser sends a request of access to a certain Aspect of an Aspect Object. The request comprises a URL address. The URL address specifies the Aspect, the Aspect Object. The method enables the use of thin clients to access Aspects of Aspect Objects representing functions of real world objects connected to a control system.

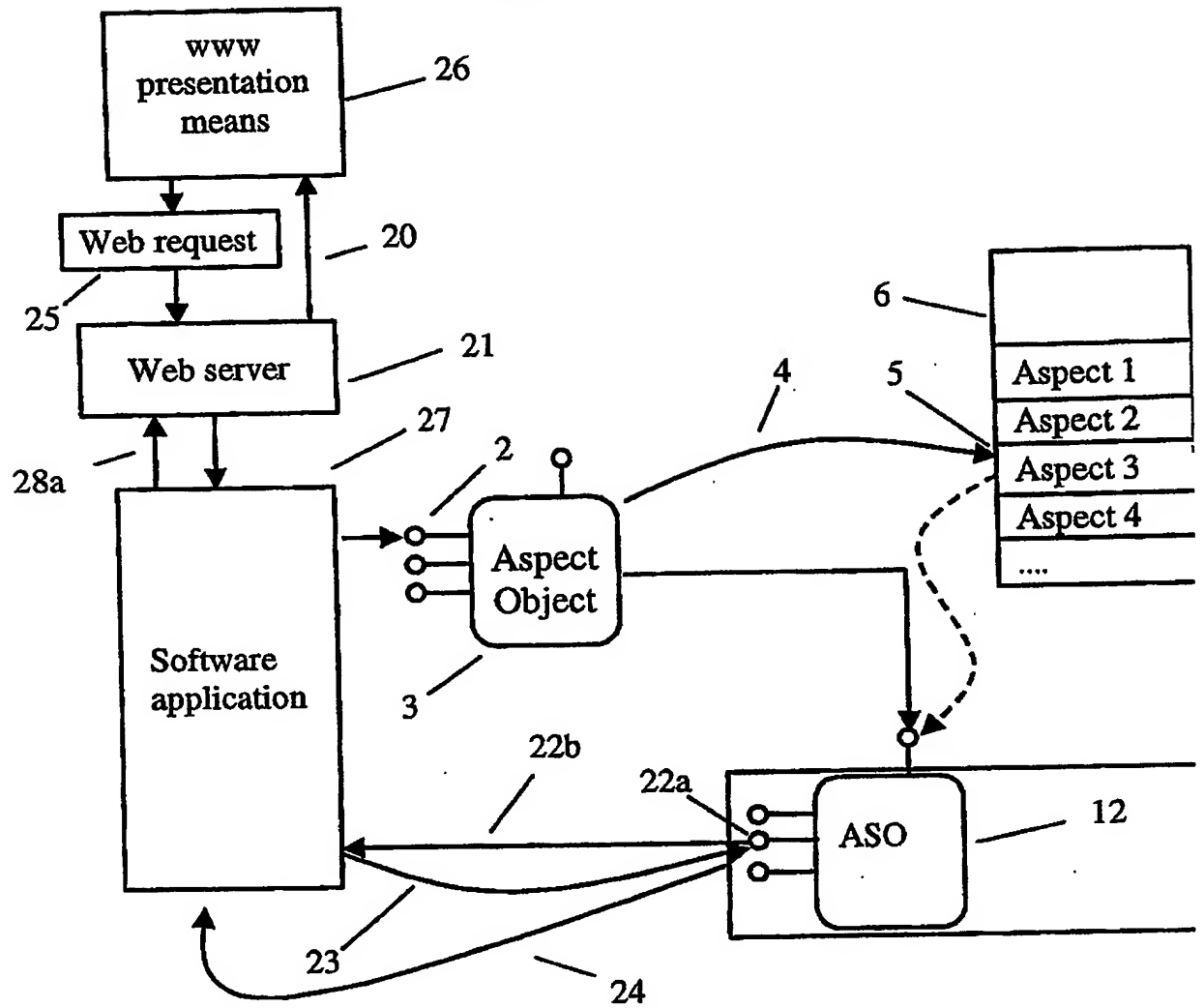
10

Fig. 2

102.12.19



**Fig. 1 (prior art)**



**Fig. 2**

3/3

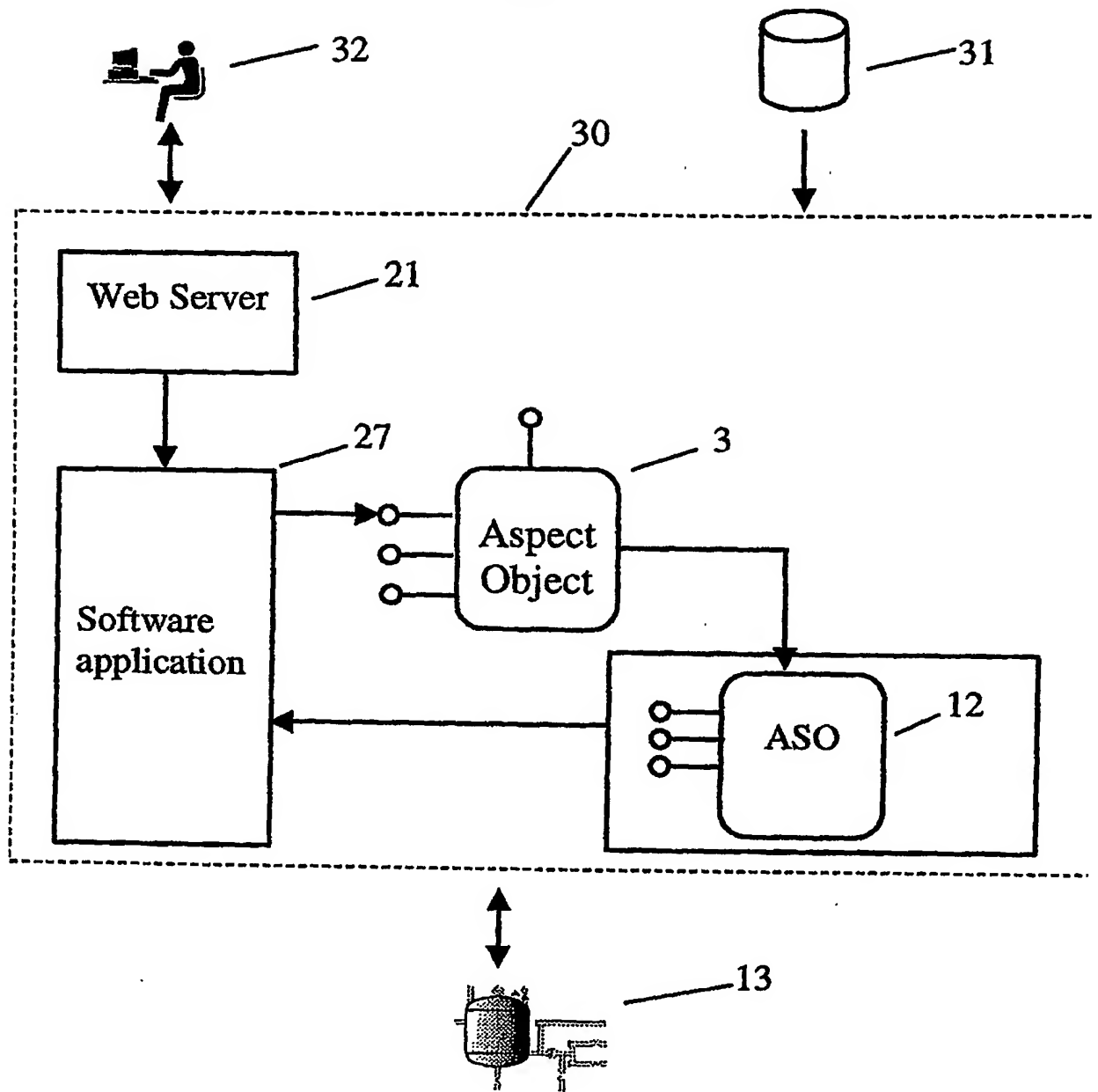


Fig. 3

## PATENT COOPERATION TREATY

PCT

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY  
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 9478WO/UR	FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. PCT/SE 2003/001984	International filing date (day/month/year) 16-12-2003	Priority date (day/month/year) 19-12-2002
International Patent Classification (IPC) or national classification and IPC G06F 9/46		
Applicant ABB AB et al		

<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>5</u> sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input type="checkbox"/> (sent to the applicant and to the International Bureau) a total of _____ sheets, as follows:</p> <p><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>	
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the report</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p>	

Date of submission of the demand 30-06-2004	Date of completion of this report 04-04-2005
Name and mailing address of the IPEA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. +46 8 667 72 88	Authorized officer Oskar Pihlgren/MN Telephone No. +46 8 782 25 00

# INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/2003/001984

## Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

- ☐ This report is based on a translation from the original language into the following language \_\_\_\_\_, which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
  - ☐ publication of the international application (under Rule 12.4)
  - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

- ☒ the international application as originally filed/furnished

- ☐ the description:

pages \_\_\_\_\_ as originally filed/furnished

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

- ☐ the claims:

pages \_\_\_\_\_ as originally filed/furnished

pages\* \_\_\_\_\_ as amended (together with any statement) under Article 19

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

- ☐ the drawings:

pages \_\_\_\_\_ as originally filed/furnished

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

- ☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages \_\_\_\_\_

☐ the claims, Nos. \_\_\_\_\_

☐ the drawings, sheets/figs \_\_\_\_\_

☐ the sequence listing (*specify*): \_\_\_\_\_

☐ any table(s) related to the sequence listing (*specify*): \_\_\_\_\_

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages \_\_\_\_\_

☐ the claims, Nos. \_\_\_\_\_

☐ the drawings, sheets/figs \_\_\_\_\_

☐ the sequence listing (*specify*): \_\_\_\_\_

☐ any table(s) related to the sequence listing (*specify*): \_\_\_\_\_

\* If item 4 applies, some or all of those sheets may be marked "superseded."

**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement****1. Statement**

Novelty (N)	Claims	<u>1-13</u>	YES
	Claims		NO
Inventive step (IS)	Claims		YES
	Claims	<u>1-13</u>	NO
Industrial applicability (IA)	Claims	<u>1-13</u>	YES
	Claims		NO

**2. Citations and explanations (Rule 70.7)****Cited documents**

D1: US 2002/0059470 A1  
D2: EP 0969389 A2  
D3: WO 01/02953 A1  
D4: EP 1220507 A1

**Statement**

D1, which is considered to be the prior-art-cited-document most closely related to the present invention, discloses a method and system for invoking by a client computer system of a function of an object of an object class provided by a server. The client sends a request to a server that comprises a Universal Resource Locator that identifies a script, an object class and a function of the object class to invoke. The function is executed on the server side and a response is sent to the client (see abstract and figure 1). As a part of the HTTP-request from the client User-Agent-data is sent that identifies which kind of browser initiated the request (see figure 10).

D2 describes a method for generating an interface for a client that is adapted to the characteristics of the client (see abstract). Information about different properties for different clients, such as the size of the display, the resolution etc is stored in a database. Information about the type of client is transmitted with a HTTP-request in the field User-Agent. By using this information the system can retrieve the properties of the client and adapt the interface.

.../...



## Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: BOX V

What is claimed in claims 1, 2, 4, 5, 8, 10, 12 and 13 differs from the system and method disclosed in D1 by the following features:

- The URL-address refers to an Aspect Object and an Aspect, whereas the address in D1 refers to an object class and a function at the object.
- The response is adapted to the properties of the client by using context information.

It is considered to be obvious to a person skilled in the art with knowledge of D1 to realize that the technique to use a function at an object with an URL-address is applicable regardless of how the object is implemented. Furthermore, the technique with Aspect Objects is well known in prior-art, such as D3. Therefore the use of Aspect Objects does not solve any problem besides what is solved by D1.

To adapt a response message to the properties of the client, has the advantage that different kinds of clients automatically can receive a response message that is properly formatted regarding the size of the display, the resolution etc.

However, the technique to format a response message so that it is adapted to the client, is well known in prior-art such as D2. In this document the field User-Agent can be used for sending information about the client, see figure 5.

A person skilled in the art, who seeks a solution to the problem to automatically adapt the response message to different kinds of clients, will find that solution in D2. D2 also teaches that information in the User-Agent field can be used for finding information about the properties of the client and thereby adapt the response. Since the User-Agent field is used in both D1 and D2, and no unexpected technical effects arise, it is considered obvious to a person skilled in the art to combine D1 and D2 and thereby arrive at the solution described in claims 1, 2, 4, 5, 8, 10, 12 and 13. What is claimed in these claims is therefore considered to lack an inventive step.

What is claimed in claims 3, 6, 7, 9 and 11 is considered to be only minor accessory technical details which are obvious to a person skilled in the art and which in themselves discloses nothing inventive.

.../...

**Supplemental Box**

In case the space in any of the preceding boxes is not sufficient.

Continuation of: BOX V

To summarize, the invention according to claims 1-13 is novel but considered to lack an inventive step. The invention has industrial applicability.

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